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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/723,215

11/26/2003

Michael O. Polley

TI-36036 (1962-08100)

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EXAMINER

GHULAMALI, QUTBUDDIN

ART UNIT

PAPER NUMBER

2611

MAIL DATE

DELIVERY MODE

05/02/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/723,215

Applicant(s)

POLLEY ET AL.

Examiner

Qutub Ghulamali

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 17-24 is/are rejected.
- 7) ☒ Claim(s) 12-16, 25, 26 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1:85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claims 1, 2 and 18 objected to because of the following informalities:

Claim 1, line 7, recites "the antennas". Shouldn't it recite the plurality of antennas, see line 3 in the claim.

Claim 1, line 8, recites "the highest communication quality". Shouldn't it recite "a highest communication quality"? Similarly, in line 12, "highest" requires to be inserted before communication quality.

Claim 2, line 3, recite "the antenna". It is not clear which antenna in reference to claim it is referring to.

Claim 18, line 5-6, recite "the antenna". It is not clear which antenna it is referring to in the claim.

Claim 18, line 11, "the amount of power" needs to be replaced with "an amount of power".

Appropriate corrections are required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

Art Unit: 2611

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 9-11, 17, 23-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Raleigh et al (USP 6,144,711).

Regarding claim 9, Raleigh teaches, transmitting data from a first wireless device to a second wireless device using a plurality of antennas, wherein each antenna communicates with the second wireless device via an associated communication pathway (col. 2, lines 1-15);
determining channel characteristics (within Channel ID block 130, the characteristics of the digital communication channel are estimated, the estimated channel values consist of entries in a matrix for each SOP bin, the matrix contains complex values representing the magnitude of the spatial channel within the SOP bin from one transmit antenna element to one receive antenna element, the transmitted information among the various sub-channels available for transmission are determined based upon the measured communication quality of the space frequency information that carries the symbol stream) associated with each of the antennas (col. 8, lines 1-9; col. 5, lines 61-67; col. 6, lines 1-5);
on a per sub-channel basis, computing a weighting vector for each antenna based on the channel characteristics (col. 2, lines 1-15; col. 6, lines 42-67);
for each communication pathway, combining a transmission signal with the weighting vector to form a weighted transmission signal (col. 6, lines 42-40; col. 8, lines 40-48);
and

transmitting the weighted transmission signal from the second wireless device to the first wireless (from one device to another) device via a plurality of communication pathways (col. 6, lines 42-50; col. 7, lines 35-39).

Regarding claim 10, Raleigh discloses data transmission from one wireless device to a plurality of devices and receives data from a plurality of wireless devices (col. 2, lines 1-8).

As per claim 11, Raleigh discloses each weighting vector specifies a relative transmission power for each sub-channel (col. 8, lines 63-67).

As to claim 17, Raleigh discloses various sub-channels are characterized by the signal-to-noise ratio (col. 18, lines 8-25).

Regarding claim 23, Raleigh discloses a method comprising: for each of a plurality of antennas, determining communication quality of each sub-channel of a communication pathway, the communication pathway comprising a plurality of sub-channels (a "sub-channel" is a combination of a bin in a substantially orthogonalizing procedure (SOP)) (col. 1, lines 31-59; col. 2, lines 1-15);

for each sub-channel, selecting at least one antenna (selects at least one spatial direction associated with an antenna, see fig. 24) for data transmission based on the communication quality of said antenna (col. 26, lines 49-52; col. 27, lines 45-55); and concurrently transmitting data via the plurality of antennas across the plurality of sub-channels (col. 27, lines 64-67).

As per claim 24, Raleigh discloses determining a signal-to-noise ratio for each antenna and for each sub-channel (col. 18, lines 8-26); and wherein, for each sub-

Art Unit: 2611

channel, selecting at least one antenna comprises selecting only the antenna having the highest signal-to-noise ratio (col. 27, lines 46-55).

Allowable Subject Matter

4. Claims 1-8, 18-22, would be allowable if rewritten or amended to overcome the claim objections, set forth in this Office action.
5. Claims 12-16 and 25-26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US Patents:

US Patent (4,063,174) to Gupta et al.

US Patent (6,118,773) to Todd.

US Patent (5,710,995) to Akaiwa et al.

US Patent (5,465,271) to Hladik et al.

US Pub. (2006/0109926) to Jalali et al.

US Pub. (2005/0047517) to Georgios et al.

US Pub. (2004/0184570) to Thomas et al.

US Patent (2005/0201477) to Cho et al.

Art Unit: 2611

Publications:

Benyassine, A.; Akansu, A.N., "Optimal subchannel structuring and basis selection for discrete multicarrier modulation", IEEE, Global Telecommunications Conference, 13-17 November 1995, Page(s) 97 – 101.

Jian Yang; Roy, S.; "On joint transmitter and receiver optimization for multiple-input-multiple-output (MIMO) transmission systems", IEEE, Transactions on communications, Volume 42, Issue 12, Dec. 1994, Page(s) 3221 – 3231.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Qutub Ghulamali whose telephone number is (571) 272-3014. The examiner can normally be reached on Monday-Friday, 7:00AM - 4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

QG:
April 17, 2007.


MOHAMMED GHAYOUR
SUPERVISORY PATENT EXAMINER